

# 2023 DAVIS-PURDUE AGRICULTURAL CENTER RESEARCH AND DEMONSTRATION PROJECTS

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## **Indigenous Soil Potassium (K) Supply, Fertilizer K Use-Efficiency, and K Budgets in Indiana Corn and Soybean Production**

Purpose: Evaluate the agronomic efficiency of currently recommended K fertilizer rates; evaluate theoretically improved soil K tests for the ability to predict soil K supply.

Contact: Shaun Casteel and Jim Camberato; Agronomy and Alex Helms, Southeast Purdue Ag Center

## **Crop Residue Study**

Purpose: We will collect traditional crop residue cover percentage measurements using line transect methods and also collect ultra-fine spatial resolution UAS data over the same field. The UAS data will provide means to generate wall-to-wall estimates of crop residue cover percentage of each field, which then can be used to scale the crop residue cover percentage estimation using spaceborne remote sensing technology.

Contact: Jinha Jung and Seth Hackney, School of Civil Engineering

## **Corn Response to Nitrogen Fertilizer Application Timing Following a Rye Cover Crop**

Purpose: To determine optimum nitrogen fertilizer timing in corn following a rye cover crop. Nitrogen fertilizer application timings include starter + V6, starter + V10, and starter + V6 + V10.

Contact: Dan Quinn, Agronomy

## **NRCS Precision Nitrogen Management**

Purpose: Test the feasibility of utilizing satellite imagery to predict variable rate sidedress nitrogen fertilizer rates in corn.

Contact: Dan Quinn and Ana Morales, Agronomy

## **Soybean Seeding Rate Trial**

Purpose: Identify agronomically and economically optimum seeding rates for soybean production in Indiana.

Contact: Shaun Casteel; Agronomy

## **Sulfur by Foliar Protection Study**

Purpose: Evaluate potential synergies with sulfur application and in season fungicide and insecticide in soybeans

Contact: Shaun Casteel; Agronomy

### **Long Term Impact of Cover Crops on Cash Crop Nutrient Uptake, Yield & Nitrogen Application Rate**

Purpose: Evaluate barriers in cover crop inclusion; deepen our understanding of cover crop to affect the availability of manure and inorganic Nitrogen to cash crops in multiple cropping systems.

Contact: Shalamar Armstrong, Agronomy

### **Weed Science Herbicide Evaluation**

23-DPAC-Bayer-CCW, non-crop, Confidential Evaluation of Bayer Products for PPO-Resistant Waterhemp

23-DPAC-CHS, soybean, Confidential Evaluation of CHS Glufosinate Formulations and Adjuvants

23-DPAC-SIPCAM, corn, Evaluation of SIPCAM products on a Fine Soil Type

DRONE Contact vs Systemic, Purdue evaluation of drone applications using glyphosate and glufosinate at multiple carrier volumes

DRONE-Nozzle, Purdue evaluation of drone applications using various nozzle types in 2 different carrier volumes

Contact: Bryan Young and Bill Johnson, Botany and Plant Pathology

### **Aerial Reconnaissance of the Effects of Disturbed Soil Due to Recent**

Purpose: An opportunity to determine what can be detected using UAV cameras and sensors throughout the growing season

Contacts: Bob Nielsen & Jim Camberato; Agronomy

### **Soybean Yield Response to Applied Sulfur Fertilizer and the Potential for Sulfur Carryover to the Following Corn crop**

Purpose: Evaluate the potential for residual soil Sulfur the following year for Corn.

Contacts: Bob Nielsen, Jim Camberato and Dan Quinn; Agronomy

### **UAV Stand Assessments of Soybean (Seeding Rate x Plant Type)**

Purpose: Use UAV imagery to assess stand establishment as well as standard protocol for scouting of soybean early to late season.

Contact: Shaun Casteel, Agronomy

### **FMC Agricultural Solutions**

1. 200 Preemergence Mixtures for annual weed control in field corn in high OM soils – 16 treatments x 3 Reps
2. 201 Preemergence compounds for annual weed control in corn and soybeans – 11 treatments x 3 reps
3. 204 Preemergence Mixtures for annual weed control in field corn in high OM soils – 14 treatments x 3 Reps
4. 206 Preemergence Mixtures for annual weed control in field soybeans in high OM soils – 11 treatments x 3 Reps

5. 242 Experimental compound premixes for weed control and crop safety in soybeans – 14 treatments x 3 reps
6. 248 Preemergence formulation testing on experimental compounds – 8 treatments x 3 reps
7. 249 Post emergence formulation testing on experimental compounds – 14 treatments x 3 reps

Purpose: Evaluate Crop Response of Corn/Soy, overall efficacy of all weed species present (% control), and stalk or root lodging (corn only). In soybean trials, stand counts were evaluated to characterize the treatment effect of heavy rains after chemical application.

Notes were taken on symptomology on both the crop and weed species. Soil samples were taken in order to compare results at DPAC with trials implemented at other sites around the Midwest with similar soil properties.

Contact: Scott Swanson, FMC Agricultural Solutions, Field Development Representative - Midwest

### **Controlled Drainage for Improvement of Water Quality**

Purpose: Quantify environmental benefits of managed drainage and use of soil amendments under standard crop production.

Contact: Brenda Hofmann, Biological Science Technician and Javier Gonzalez, Soil Scientist with USDA-ARS National Soil Erosion Research Lab

### **Interaction of Management Practices on Soil Health and Water Quality**

Purpose: Develop management techniques using cover crops and gypsum to increase soybean yield while maintaining soil health.

Contact: Brenda Hofmann, Biological Science Technician and Javier Gonzalez, Soil Scientist with USDA-ARS National Soil Erosion Research Lab

### **Cover crops, phosphorus and sulfur management on soil quality and grain yield**

Purpose: Evaluate the effects of cover crops on soil phosphorus, sulfur and soil quality and grain yield

Contact: Brenda Hofmann, Biological Science Technician and Javier Gonzalez, Soil Scientist with USDA-ARS National Soil Erosion Research Lab

### **Legacy of Phosphorus**

Purpose: Evaluate soil phosphorus drawdown rates, plant phosphorus uptake, and potential changes in corn and soybean yield with elimination of phosphorus fertilizer to long- term Fertility research plots.

Contact: Brenda Hofmann, Biological Science Technician and Javier Gonzalez, Soil Scientist with USDA-ARS National Soil Erosion Research Lab

### **Influence of the rate and frequency of FGD gypsum applications and cover crops on soil health and water quality**

Purpose: Determine the effects of gypsum on grain yield and soil and water quality.

Contact: Brenda Hofmann, Biological Science Technician and Javier Gonzalez, Soil Scientist with USDA-ARS National Soil Erosion Research Lab

### **Rainfall on Gypsum and Manure Plots Study**

Purpose: Evaluate the effects of gypsum on phosphorus runoff from manured plots under mechanical rainfall

Contacts: Contact: Brenda Hofmann, Biological Science Technician and Javier Gonzalez, Soil Scientist with USDA-ARS National Soil Erosion Research Lab

### **UAV Red-Edge Imagery to Identify Nitrogen Deficiencies in Corn**

Purpose: Document differences in light reflection in red-edge light from different corn hybrids

Contact: Mark Carter, UAV Extension Specialist

### **Topography Influences on Crop Yield**

Purpose: Use high resolution LIDAR topography data to evaluate water flow and moisture Contact: Dennis Buckmaster, Ag and Biological Engineering

### **Soybean Aphid Suction Trap Network**

Purpose: Monitor flight of soybean aphids.

Contact: Christian Krupke; Entomology

### **Insect Pest Monitoring Network**

Purpose: Monitor insect pest levels of corn, soybeans and wheat.

Contact: John Obermeyer; Entomology

### **Cooperative Ag Pest Survey**

Purpose: DPAC is used as a monitoring site for a statewide trap grid for the early detection of exotic, invasive insect pests of soybean and vegetables.

Contact: Larry Bledsoe; Entomology

### **Heliothine Research Survey**

Purpose: Use DNA samples from Heliothine moths (Corn earworm) collected weekly throughout the United States to determine the phenology and distribution of a group of viruses known to infect those moths and determine how to use those viruses in IPM strategies.

Contact: Paul Baker, Bruce Webb UKY and John Obermeyer; Entomology

### **Purdue Automated Agricultural Weather Station (PAAWS)**

Purpose: Automated collection of weather data from this site is sent to the Indiana State Climate Office at Purdue University - data can be observed at:

<http://climate.agry.purdue.edu>

Contacts: Beth Hall; Agronomy

### **National Weather Service Weather Station (NWS)**

Purpose: Record weather data on a daily basis and maintain weather record data base.

Contact: Brad Herald, National Weather Service

### **Understanding Habitat Needs of Northern Long-Eared Bats**

Purpose: Monitor activity of Northern Long-eared bats through various collection methods.

Contact: Cheyenne Gerdes, Dr. Patrick Zollner, Forest and Natural Resources

### **Mixed Hardwood Demonstration Tree Planting**

Purpose: Demonstrate mixed hardwoods trees planted in Indiana and the effects deer have on growth and survival of the planted and voluntary trees.

Contact: Don Carlson; Forestry and Natural Resources

### **Wildlife Shrub Demonstration Plantings**

Purpose: Demonstrate several commonly planted wildlife species and the effects deer have on growth and survival.

Contact: Don Carlson; Forestry and Natural Resources

### **Forest Regeneration Demonstration Area**

Purpose: Demonstrate how a forest regenerates following the removal of the woody material. Supplemental tree planting of both standard and select nursery stock occurred on the sites along with fencing of half of the site to exclude impacts of deer on regeneration.

Contact: Don Carlson; Forestry and Natural Resources

### **Long Term Continuous Forest Inventory**

Purpose: Permanent forest inventory plots have been established and maintained on most of the woodlands at Davis PAC to monitor changes in species abundance, growth, survival, and timber quality over time.

Contact: Mike Jenkins and Don Carlson; Forestry and Natural Resources

### **80+ years of Central Hardwood Forest Dynamics**

Contacts: Mike Jenkins and Robert Morrissey, Hardwood Tree Improvement and Regeneration Center, Department of Forestry and Natural Resources